

**UCSC****University of Colombo, Sri Lanka***University of Colombo School of Computing***DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY  
(EXTERNAL)**Academic Year 2024 — 3<sup>rd</sup> Year Examination — Semester 6**IT6206 — Software Quality Assurance***Structured Question Paper*

(2 Hours)

**To be completed by the candidate****Index Number**

--	--	--	--	--	--	--

**Important Instructions**

- The duration of the paper is **2 hours**.
- The medium of instructions and questions is English. Students should answer in the medium of English language only.
- This paper has **4 questions** on **11 pages**. Answer **all** questions.
- All questions carry **equal** marks.
- Write your answers **only on the space provided** on this question paper.
- Do not tear off any part of this question paper. Under no circumstances may this paper (or any part of this paper), used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper. If a page or part of a page is not printed, please inform the supervisor/invigilator immediately.
- Any electronic device capable of storing and retrieving text, including electronic dictionaries, smartwatches, and mobile phones, is not allowed.
- Calculators are **not allowed**.
- *All Rights Reserved*. This question paper can NOT be used without proper permission from the University of Colombo School of Computing.

**To be completed by  
the examiners**

<b>1</b>	
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>Total</b>	

- 1) (a) According to ISO definition (ISO, 1997), a software includes four basic components. List down the four (4) basic components of a software. (4 marks)


- (b) There are seven statements made by the testing teams during different types of static reviews. Select the correct review type for each of the statements using the numbered list given below. Write down the sequence number of the correct choice in the box provided in front of the category. (1x7 = 7 marks)

**List of static review types:**

- 1 Informal (Pair review)
- 2 Walkthrough
- 3 Technical review
- 4 Inspection

1	Hey, I noticed you are using a custom function here - want to use the built-in one instead?	
2	From a user perspective, this input validation could be stricter—have you considered unexpected characters?	
3	Let us test this logic together, I think there might be an edge case we are missing.	
4	In this part of the code, can you explain why you chose to use a linked list instead of an array?	
5	On line 47, the variable name temp2 is not descriptive—violates naming convention rule ID-03.	
6	This module does not follow our logging standard—please use the centralized logger with context tags.	
7	The algorithm's complexity seems to be $O(n^2)$ . Could we optimize it for better performance?	

(c) State whether each of the following statements is **true (T)** or **false (F)**. (1x10 =10 marks)

1. Regression testing is done before fixing bugs or updating the system to make sure nothing breaks.
2. In white-box testing, testers can see and use the code while testing.
3. Decision, branch, and condition coverage are key methods used in white-box testing.
4. White-box testing checks how the software works inside, not just what it does on the outside.
5. Finite State Machine testing checks if the software moves correctly between different states (used in black-box testing).
6. Stress testing checks if the software can handle a lot of pressure or heavy use without crashing.
7. Static testing helps prevent problems, while dynamic testing helps find and fix them.
8. Writing test scenarios, test cases, and preparing test data are part of making tests.
9. Bugs go through different stages like New, In Progress, Deferred, etc., as they are being fixed.
10. Integration testing finds problems with how different parts of the system work together.


(d) List down four (4) features of good test cases. (4 marks)


- 2) (a) Selenium is a free and open-source test automation suite which is widely being used in web applications. It supports test automation across different browsers, platforms, and programming languages. Name and explain the four components of Selenium suite. (12 marks)

[illegible]

- (b) Briefly explain what is meant by Software test automation? (4 marks)


- (c) Write down five advantages of software test automation. (5 marks)


- (d) “Software test automation is not always possible”. State whether the statement is true or false. Justify your answer with an example. (4 marks)


- 3) (a) XPath is one of the most popular HTML element locators in Test Automation. Briefly explain the general XPath format using an example.

(5 marks)


- (b) Write down three (03) alternative techniques to locate elements in an HTML document other than XPath. (3 marks)


- (c) Write the correct relative XPath for the given scenarios. (2x5 = 10 marks)

- i) Write an XPath to select the input element where the *id* is “username”.

```
<div>  
  <input type="text" id="username" name="user" />  
  <input type="password" id="pass" name="password" />  
</div>
```


- ii) Write an XPath to select the list item (<li>) that contains the text *"Contact"*.

```
<ul>
  <li>Home</li>
  <li>About</li>
  <li>Contact</li>
</ul>
```

---

---

---

- iii) Write an XPath to select the <div> with class containing the word *"success"*.

```
<div class="notification success">Success! Your file was uploaded.</div>
<div class="notification error">Error! Please try again.</div>
```

---

---

---

- iv) Write an XPath to select the second <li> element in the list.

```
<ol>
  <li>Step One</li>
  <li>Step Two</li>
  <li>Step Three</li>
</ol>
```

---

---

---

- v) Write XPath to capture 'h2' node using *text()* function.

```
<div class="product">
  <h2>Item 1</h2>
  <span class="price">$10</span>
</div>
<div class="product">
  <h2>Item 2</h2>
  <span class="price">$20</span>
</div>
```

---

- (d) Write down the correct XPath axis name in front of each of the given definitions. (1x7 = 7 marks)

Selects all immediate (direct) children of the current node	
Selects the <b>immediate parent</b> of the current node.	
Selects <b>all ancestors</b> of the current node, all the way up to the root.	
Selects all siblings <i>after</i> the current node.	
Selects all nodes that come <b>before</b> the current node in the document, except for ancestor nodes.	
Selects the current node itself	
Selects all siblings <i>before</i> the current node.	



- 4) (a) Write down whether each of the following statements is **true (T)** or **false (F)**. (1x10 = 10 marks)

TestNG XML files are used to define test suites, test groups, and the order in which tests should be executed.	
In a TestNG XML file, you can specify parameters to be passed to test methods at runtime.	
TestNG XML files are mandatory for executing tests in TestNG; tests cannot run without them.	
A single TestNG XML file can only define one test suite and cannot include multiple test configurations.	
The Page Object Model (POM) is a design pattern that promotes code reusability by creating an object repository for web elements.	
Selenium requires the use of the Page Object Model to be effective in automating tests.	
Using POM helps in reducing code duplication and improves the maintainability of test scripts.	
Assertions are used in testing to verify that the expected outcome matches the actual outcome of a test case.	
Assertions are only used in unit testing and are not applicable to integration or functional testing.	
Assertions can be categorized into different types, such as soft assertions and hard assertions and regular assertions based on how they handle test failures.	

- (b) State whether each of the following statements is **true (T)** or **false (F)** regarding software test automation frameworks. (1x5 = 5 marks)

Data Driven Automation Frameworks allow test scripts to run with different data sets without modifying the script itself.	
Hybrid Automation Frameworks combine elements of both data-driven and keyword-driven frameworks to enhance flexibility and maintainability.	
Keyword Driven Automation Frameworks require testers to have programming knowledge to create and execute test cases effectively.	
Linear Automation Frameworks are best suited for complex applications with numerous interactions due to their structured approach.	
Library Architecture in test automation frameworks focuses on organizing reusable functions and libraries to promote code reuse and reduce redundancy.	

- (c) Write down the output of the following TetsNG programme in the given box. Note: Use your knowledge of TestNG annotations execution sequence. (5 marks)

```
public class it6206 {

    @BeforeMethod
    public void beforeMethod() { System.out.println("A"); }

    @AfterMethod
    public void afterMethod() { System.out.println("A"); }

    @AfterTest
    public void afterTest() { System.out.println("C"); }

    @BeforeTest
    public void beforeTest() { System.out.println("B"); }

    @Test(priority=1)
    public void testCase2() { System.out.println ("Test "); }

}
```

Write the output here

- (d) Write down suitable selenium commands using Java to perform given actions below. (1x5 = 5 marks)

i) Create a WebDriver instance using ChromeDriver


ii) Open the Webpage "http://ucsc.lk".


iii) Click on the button. The button's xpath is //input[@id=" btn"].


- iv) Select the Option “Sri Lanka” from a Dropdown. The dropdown element XPath is  
//select[@id=”country”]


- v) Close browser


\*\*\*\*\*